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**MEDICAL, DENTAL AND VETERINARY
EDUCATION AND PRACTICE IN GERMANY
AS REFLECTED BY THE UNIVERSITIES OF
LEIPZIG, JENA, HALLE AND ERLANGEN**

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**COMBINED INTELLIGENCE OBJECTIVES
SUB COMMITTEE**

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MEDICAL, DENTAL, AND VETERINARY EDUCATION AND PRACTICE
IN GERMANY AS REFLECTED BY
THE UNIVERSITIES OF LEIPZIG, JENA, HALLE, AND ERLANGEN

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I. Medical Practice and Education in Germany.

A. Introduction. In order to obtain a picture of medical practice and education in Germany during the war years, visits were made to selected German medical schools and university clinics. The universities visited were:

1. University of Jena,
2. University of Leipzig,
3. University of Halle.

At these institutions the following members of the medical faculties were interviewed:

1. Prof. A. Zucker, Jena
2. Prof. N. Guleke, Prof. of Surgery, Jena
3. Prof. W. Veil, Prof. of Medicine, Jena
4. Prof. W. Rieder, Prof. of Surgery, Leipzig
5. Prof. M. Bürger, Prof. of Medicine, Leipzig
6. Prof. J. Budde, Prof. of Surgery, Halle.
7. Prof. R. Cobet, Prof. of Medicine, Halle
8. Dr. F. Hammon, recently appointed director of the branch of the Asid Serum Institut G.m.b.H. at Dessau.

Physical Status of Medical Schools:

Jena. The university buildings where the pre-clinical courses were given were extensively damaged by bombing. Hospital clinics, however, have suffered comparatively little damage. The surgical clinic, which was adjacent to the Zeiss Optical Works, sustained a moderate amount of damage, not too serious in nature. In 1942, several of the clinics, including the surgical clinic, erected bomb-proof buildings adjacent to the main clinic. The bomb-proof unit for the surgical clinic was inspected. The walls of this building were 1 metre thick, constructed of steel and cement. This building was approximately 1/1½ stories beneath ground level, and 2 stories above ground level, and had an underground connection with the main clinic as well as a surface entrance. The bomb-proof building was entirely independent of the city for its water supply (supplied by its own artesian wells), electrical supply (supplied by Diesel motors), and heating. It also had its own air-conditioning and ventilating system, and many small, re-inforced windows throughout the building. For the past 1½ years most of the surgical procedures were performed in this building. It had space for about 150 patients, most of whom were women and children. Prof. Guleke had not been disturbed while performing operations in this clinic, despite the fact that bombs had fallen in the immediate vicinity. There had been no direct hits on the shelter although there was a fairly large bomb crater approximately 25 yards from the main clinic.

Leipzig. All the clinics at this university were extensively damaged; many of the buildings have been completely destroyed. For example, of approximately 1000 beds allotted to the medical clinic, about 650 have been destroyed. The laboratory and X-ray sections have been completely destroyed by bombing. Much of the more valuable surgical equipment had been transferred to the country for protection against bombing; this equipment is now in Russian territory and cannot be returned to the university. This equipment apparently consists of the most valuable instruments and is now badly needed by the clinic.

Halle. The university itself did not sustain extensive damage. The various clinics have been moderately damaged, not nearly as extensively as those at Leipzig. Approximately 150 beds out of a total of about 2600 have been destroyed.

Bed Capacity of the Various Clinics: The various universities visited had the following bed capacities:

| | | |
|-----------|-----------|----------------------|
| Jena:- | 2500 beds | |
| Leipzig:- | 3000 " | (largest in Germany) |
| Halle:- | 2000 " | |

Medical Education:

During the war, the length of the medical course (pre-clinical and clinical) was reduced from 12 semesters (6 years) to 10 semesters (5 years). In April of this year, the course was further reduced to 9 semesters (4½ years).

Student Enrollment: It was difficult to obtain an accurate estimate of the number of students. Some information was obtained from professors in the various departments, and is given below:

| | |
|---------|---------------|
| Jena | 2500 students |
| Leipzig | 1500 " |
| Halle | 700 " |

All professors agreed that the caliber of the medical students was far below the peacetime level. This, they believed, was due to the following factors: (a) Many of the students came directly from the Army, and in many cases they were men who merely desired to avoid the hardships and dangers of combat, and consequently expressed a desire to study medicine, thereby being released by the Army for study. In most cases they had neither the background or the aptitude for study in a medical school. (b) The general hardships and attitudes naturally associated with war, plus military interference of various kinds from the Army, bombings, etc., distracted the students from serious study and application.

During the war there were four sources for medical students:

(a) The largest group was drawn from physically fit men who were part of the so-called Student Combattant Corps, under the direction of the Army; they wore a uniform and were committed to the Army while at school and at the end of their studies. Many of the students in this group had apparently been selected at random by the Army and sent to study medicine; also in this group were many who asked to be sent to study medicine merely to avoid combat duty at the front. The complete tuition of these men was paid by the State. (b) A smaller group consisted of soldiers discharged from the services because of general physical disability, or for various other reasons. The State paid for the education of those in this group. After completion of their studies these students were assigned by the State either to civilian or state military hospitals. (c) Those unfit for military service, and a few excused from military service because they showed a particular aptitude for the study of medicine. These students paid their own tuition. After completion of studies these students were assigned by the State to civilian hospitals, or trained as specialists. (d) An increasing number of women were admitted to the universities to study medicine. These students paid their own tuition and after completion of studies were assigned to civilian hospitals, and a few trained as specialists.

Training of Students: It appears that the war had markedly interfered with the training of medical students; in the first place, the total length of study was decreased from 6 to 5 years, and eventually to $4\frac{1}{2}$ years. The majority of the students were under the control of the Army and had many interruptions associated with military training and duties. At least one semester (6 months) of the 2 pre-clinical years was spent as a medical corpsman in Army hospitals; at least 2 additional semesters (one year) of the remaining clinical years was spent working in front-line military hospitals. There seemed to be no systematic arrangement for the assignment of these students for periods to be spent in the Army. Apparently groups of students were sent throughout the year for periods ranging from a few weeks to 3 months; ordinarily during this time they would have worked in the various clinics such as -- surgery, medicine, otolaryngology, ophthalmology, etc. As a result of this Army service, the majority of students must have had little opportunity for bedside teaching and clinical work in hospitals. The total time spent in the university, therefore, was in reality limited to about $3\frac{1}{2}$ years. Education was further interfered with, especially during the past $1\frac{1}{2}$ years, by air-raid alerts and by the destruction of buildings by bombing. For example, although lectures were always started at 0800 hours, by 1000 hours there was usually an air-raid alert, which forced students to enter shelters and remain there until about noon. Frequently there was another alert at about 1400 hours. Evening study was interrupted by alerts, and sleep interfered with, but only about 50% of the time was it possible to attend classes. There was considerable

overcrowding of students personnel during the past 1½ years as a result of the destruction of certain university buildings by bombing. At times the professor of surgery had as many as 250 students in one class. As the number of assistants decreased by about 50%, and the civilian patient load was quite heavy, it was practically impossible for the teachers to conduct classes as thoroughly as in peacetime.

Tuition: Tuition costs were about 300 - 400 Marks per year; living expenses came to about 120 Marks per month.

Training of Specialists: Ordinarily in peacetime professors of medicine and surgery had approximately 20-40 assistants each. These assistants were trained from 4-10 years in their respective specialties. During the war the number of assistants was reduced approximately by half.

During peacetime and early in the war, at least 2 Army officers (medical) were sent to each clinic for further study in surgery and medicine. Before the end of the war the number of Army doctors sent and the times spent in the various clinics was variable. These men were assigned by the Army, and the number and types of students were not controlled by the professors.

Assistants were paid 5000-7000 Marks yearly, depending on the length of service. At least one of these assistants was used in the private clinic of the professor for a period of one year. Occasionally the professor would arrange for the assistant to increase his income by caring for semi-private patients in the clinic, and also by the filling out of insurance reports and papers. Prof. Guleke, for example, estimated that his assistants got approximately 55% of their income from patients to which he could have been entitled had he wished.

Selection of Students for Post-Graduate Training: A student wishing to continue post-graduate study applied to the professor of his choice. If accepted by the professor, he had to apply to the Army to be released for further study, and also had to be cleared by the Ministry of Education. Apparently the physically unfit, and the women, could take post-graduate study if they were acceptable to the professor, without having to apply to the Ministry of Education. The number of male students allowed for post-graduate study was apparently so limited that it was necessary for the professors to accept a number of women for training each year. All of the professors showed a great lack of enthusiasm for training women in the various specialties.

Time Spent in Graduate Study: There was a minimum of 4 years required, at least in surgery, before the professor issued a certificate to the student stating that he was qualified in the respective

specialty. A certificate was issued after the student had passed a successful examination. Those students showing especial ability might be retained for as long as 10 years as assistant professors, and eventually got appointments as professors in other universities. Those students not retained for prolonged training might be assigned to the various civilian clinics. The professors issued a certificate certifying that the student had passed examinations in the specialty, which was registered by a central board in Berlin; the Board merely registered the certificate given by the professor, but did not give a further examination.

Caliber of Professors Interviewed: The professors of medicine and surgery at Jena appeared to be of a high caliber, as were those at Leipzig. They were very interested in medical education in general, and expressed concern over the effects of the war on medical education. The professors at Jena and Leipzig implied directly that the heads of their respective departments at Halle were not of German university caliber, and were under the influence and patronage of the Nazi Party. A professor Wagner at Halle, who had been a relatively unknown surgeon had been appointed professor of surgery by the Party. This man has been imprisoned since the arrival of the Americans, and a new man, Prof. Budde, has been appointed as professor.

The salary of full-time professors varied between 10,000 and 13,000 Marka yearly, depending upon length of service; in addition, they had their own private clinics. The professors in all the university clinics appeared to do neurosurgical, chest, and abdominal surgery, as well as fractures. Gynecology, otolaryngology, ophthalmology, and orthopedics were under separate directors.

Prof. Guleke and Rieder has been full Colonels in the Army as consultants, during the early years of the war. Prof. Bürger (Leipzig), had also been in the Army in the same capacity.

Research: Surgical Research. As far as could be determined there was very little research done by the surgeons during the war - at least in general surgery. The demands on the surgeons for civilian practice, plus the instruction of students was most time consuming. The impression was gained that nothing particularly new had been developed in surgery during these years. Inquiry was made of each professor as to what he considered to be the greatest advance made since the war; invariably they answered, the use of sulfonamides. Second in importance was the rather widespread use of whole-blood transfusions.

Medical Research. In these departments research had been limited partly by the lack of assistants, as well as by the increased responsibilities of teaching, and of caring for patients. Most of the professors seemed to be able to continue writing about various subjects which had interested them over long periods of years.

Apparently they all had some difficulty in getting permission to reprint their articles, and it was implied by the professor at Jena that his anti-Nazi attitude had resulted in the Party's preventing publication of some of his papers, particularly those referring to medico-historical subjects.

Principles of Therapy. Surgical. The basic principles of good surgery appeared to be thoroughly understood both by Prof. Guleke (Jena) and by Prof. Rieder (Liepzig); this, however, did not apply to the former professor at Halle, and as the new professor there had only recently been appointed it was impossible to properly evaluate this university.

No new instruments were observed in any of the clinics, and nothing new in the form of surgical therapy. The impression was gained that, in general, surgical therapy was far behind that of the United States. Specific inquiry was made as to the principles of therapy commonly used.

All agreed that one of the advances of the war was the increase in the amount of whole blood used; they did not utilize a blood bank as such, however. The majority of transfusions were by the direct method, although occasionally citrate was used. They apparently did not use glucose and refrigeration as a preservative. In every city there was a list of donors, usually from large factories nearby, which made whole blood readily available. Donors were paid 25 M. for each transfusion (500 cc.) and given extra coupons for food rations; this was an adequate incentive to ensure a good supply of donors. However, they did not use blood as freely as it is used in the U.S.Army.

There was a small institute run by the Army associated with the university at Leipzig, which studied the problem of blood transfusion. It was inferred that no major contributions had been made by this group, and that the faculty was not aware of any worthwhile investigations ever having been done in this laboratory. It was common practice for all persons on the donor panel to be typed and have a Wassermann test; direct cross-match was the method utilized, and type group for type group blood was given.

Plasma was available but neither blood or plasma were used for nutritional purposes as is com on practice in the U.S.Army.

Sulfonamide Therapy. Both the professors of surgery and medicine at the various clinics stated that the use of sulfonamides was the major contribution of the war. The following types of sulfonamides were used (this list was submitted by Prof. Guleke (Jena) and are his indications for use):

1. For sprinkling in the wound:

| | |
|---------------------|--|
| Marfanil-Prontalbin |) Dust wound with 2 millimeters of the powder after excision. |
| Cibazol | |
| Eubasinum | |

2. For application per os:

Cibazol - For strepto-, staphylo, and pneumococci
 Eubasinum - Pneumo-, and meningococci
 Globucid - Strepto-, Staphylococci
 Eleudron - Same as for Globucid
 Euvernil - Unspecific infections of the urinary system
 (Spec. Coli)
 Prontosil - Same as for Euvernil
 Albucid - Same as for Euvernil

DOSAGE: Pushing therapy--5-10 gm. (0.065 grain) daily
 for 2-3 days, eventually repeated after a pause
 of 3-4 days. Beware of kidney and liver damage.
 Control urine.

3. For parenteral application:

| | | | |
|-----------|---|---------------|------------------------------|
| Cibazol | - | I.M. and I.V. |) Pushing therapy same as |
| Eubasinum | " | " " |) per os, 5-10 gm. daily for |
| Globucid | " | " " |) 2-3 days. More efficacious |
| Eleudron | " | " " |) appl. per os. If stomach |
| Euvernil | " | " " |) troubles, application by |
| Prontosil | " | ----- |) parenteral, or combined |
| Albucid | " | " " |) administrations. |
| Tibatin | " | " " |) |

In general, the professors at Jena and Leipzig were not as enthusiastic about the use of sulfonamides as was the new professor at Halle. Furthermore, the surgeons were not as enthusiastic about the efficacy of sulfonamides as were the internists. The impression was gained that they were not too sure of its value in the treatment of open wounds. Apparently sulfonamides were not routinely applied in the peritoneal cavity except in the presence of infection, in which case they were used intraperitoneally. They did not hesitate to use as much as 20 gms., which is a much higher dose than that used in the U.S. There appeared to be some shortage of sulfonamides during the past 6 months as a result of the destruction of some of the factories.

Care of Wounds. The majority of wounds were left open; debridement was done if the wound was seen within 48 hours after the time of injury. Apparently both in civilian practice and in the Army, it was optional with the surgeon as to whether or not sulfonamides were dusted into the wounds. They all emphasized that adequate surgery was more important than chemotherapy.

Secondary Closure of Wounds. Secondary closure of wounds was sometimes carried out from 5-7 days after debridement if the wound was in good condition. Only large wounds were closed, and this principle was never followed in wounds of the hands and feet. Apparently secondary closure of wounds was not a common practice in the Army.

Burns. The treatment of burns appeared to be fairly standard in the clinics visited. There was a tendency to give a whole blood transfusion daily, if it was obtainable; plasma was used as a substitute for whole blood, but massive doses of plasma were apparently not utilized. Corterone (1 ampoule of 5 mgm., given twice weekly) was routinely used. Wounds were usually debrided by brushing and alcohol; this was done under general anesthesia. Following the debridement, a powder whose active principle was tannin (Freksan) was applied and covered with dry gauze. In some instances boric acid and vaseline (or cod liver oil) were applied locally to the burned area; some apparently used tannic acid and silver nitrate. Pressure dressings, immobilization, early skin grafting and the scientific requirements of blood and plasma replacement were not appreciated.

Gas Gangrene. There was general agreement that adequate radical surgery was the only efficient method of preventing gas gangrene, as well as treatment after infection had developed. Gas gangrene antitoxin was apparently used in the Army for wounds in the susceptible areas (upper thigh and shoulder girdle). The professors did not feel that antitoxin was ever an effective form of therapy; sulfa drugs were used but they had no confidence in the effectiveness of these drugs. At the Asid Serum Institute (Dessau) it was pointed out that the Army had requested that perfringens only be used in their antitoxin.

Tetanus. There was relatively little tetanus observed in civilian practice. In one clinic, however, 20 cases were recently (Jena), and the impression existed that the antitoxin which had been manufactured in the last 6 months was faulty. Those men who had served in the Army had noted a higher incidence at the front. Tetanus antitoxin was apparently given to all who had been wounded; there was no mention of the use of toxoid, however. At the Asid Serum Institute (Dessau), however, tetanus toxoid was available 2 injections were given 6 weeks apart -- this immunisation was supposedly effective for approximately 3 years.

The treatment of tetanus consisted of the injection of about 20,000 U. daily (antitoxin), alternating between intrathecal and I.V. administration. Avertin was used to control muscle spasm; Prof Budde (Halle) reported recovery on 3 out of 5 cases.

Neurosurgery. Prof. Guleke (Jena), a neurosurgeon with training under Dr. Cushing in the early days, stated that one of the

advances in surgery was the primary closure of brain wounds. The early approximation of nerve injuries was not practiced. Prof. Guleke's indications were -- primary suture for radial and ulnar nerve (below elbow) about 4 months after injury; for nerve injuries above the elbow, 6 months after injury; and for division of the sciatic nerve, 8 months after injury. In cases operated by him he would attempt to approximate the ends of nerves with silk. It was his impression that better results might be obtained if early suture was attempted, and if neurolysis was carried out more frequently.

Chest Surgery. The following information was obtained from Prof. Guleke: There was apparently very little attempt made in the forward areas of the Army to remove foreign bodies from the lung. Foreign bodies larger than 1-1½ cm. were removed if they had rough edges. Smooth foreign bodies, asymptomatic, were apparently not removed, regardless of size. The fixed indications appeared to be hemorrhage, abscess, or pain associated with the foreign body.

Empyemas were treated with suction for about 3 weeks; this was done through a #16 catheter. Irrigations were never used. Hemothorax was treated by aspiration during the first 4 weeks; there was no special attempt made to keep the pleural spaces completely dry. Decortication was not generally practiced.

Abdominal Surgery. There were no new principles of abdominal surgery noted. Sulfa drugs were not routinely applied in the peritoneal cavity after intestinal operations. They were sometimes used in doses as high as 20 gms. in the presence of infections such as appendicitis. Colostomies were not routinely performed for injuries of the large bowel.

Blood Vessel Surgery. Some attempts had been made to perform blood vessel anastomosis in forward areas, utilizing fine silk. Apparently there was no heparin available and no special techniques were developed.

The femoral vein was ligated for infected infarcts; this principle did not appear to be as widely used as it is in the US, especially as a prophylactic measure.

Trench Foot, Causalgia. Very little trench foot was treated in the clinics visited. The causalgias and late discomforts resulting from trench foot were treated by paravertebral block (3/4% novocaine-- 10 cc- in 2nd or 3rd ganglion in the lumbar region). For troublesome causalgia, 1 cc. of 70% alcohol was injected in the neighborhood of the appropriate ganglion after the preliminary injection of novocaine.

Anesthesia. The operating rooms in all 3 clinics visited had not one single modern anesthesia machine. It may be that some of these machines have been sent to the Army, or stored outside the city. However, it could not be determined that the surgeons ever used gas anesthesia, and they seemed to have had little or no experience with intratracheal anesthesia. They used novocaine ($\frac{1}{2}$ -1%) in many operations; barbiturates were widely used intravenously. Prof. Rieder for example, used Evipan anesthesia for gastric operations. Ether was used for inhalation anesthesia except for the presence of lung infection, when chloroform was used. There was little mention of the use of spinal anesthesia; it certainly was not used in surgery of the high abdomen. Morphine, pantopen, dilaudid, and scopolamine were used in various combinations.

Instruments and Operating Room Equipment. There were no new instruments or modern devices observed in any of the clinics visited. Scalpels with detachable blades were not used. Sewing clamps of the Von Petz type were available for gastric and intestinal surgery. There was usually one electro-coagulation and cutting unit available in each clinic.

Vitamins. Vitamin preparations were apparently used by the various surgeons, but they did not place as much confidence in these preparations as the internists did. Prof. Guleke pointed out that children with empyema who had been treated in the bomb-proof hospitals for at least 6 months, getting very little sunshine, seemed to do about as well as those who had been treated in other hospitals where plenty of sunshine was available. Vitamin K did not seem to be extensively used. Jaundice was treated with calcium and blood transfusions. It appeared that the surgeons were not as familiar with vitamin K as were the internists.

Malnutrition. There was no evidence that the surgeons used intravenous replacement therapy for malnutrition. They had no amino acid preparations available.

Penicillin. None of the clinics had experience with the use of penicillin. It was mentioned at the Acid Serum Institute that they had carried out some studies on penicillin with a mold obtained from Holland. They stated that it was not as effective as that produced in the U.S. All clinics inquired about penicillin and wondered if it would be available to German clinics.

Shock Therapy. There was no information gained regarding investigations in the treatment of shock. The impression received was that while whole blood transfusions were given the usual laboratory procedures to determine the blood loss were not carried out.

Medical. Probably the most productive medical clinic was that at Leipzig, headed by Prof. Bürger. The professors of medicine appeared to have carried out more research, or at least appeared to have written more papers in the last 5 years than the surgeons.

They all agreed that the use of sulfonamides was the major contribution in medicine during the war.

Typhus. None of the clinics had a special treatment for typhus; the entire therapy appeared to be symptomatic. During the 5-year period the Leipzig clinic treated about 450 cases of typhus; 100 of these cases were in Germans, and the remainder in foreigners (largely Poles and Russians). It was the impression that the initial German mortality was almost 30% (same rate for French), compared to a persistent mortality of about 10% in the Poles and Russians. This was interpreted as being due to a lack of natural immunity in Germans and French. For some unexplained reason the mortality among the Germans and French eventually fell to 10%. Anti-typhus serum was available but the results obtained were not satisfactory.

Synthetic Foods. Especially butter derived from coal tar were investigated at the universities at Leipzig and Halle. It was agreed that the absorption of this substance was about 90%. At Leipzig they had carried out considerable research on colorimetric methods for working on foods and feces to determine the amount of food absorption. It was implied at one clinic that the synthetic butter did not show a tendency to produce acidosis; this, however, was refuted by others.

Hepatitis. Infectious hepatitis in the civilian population was not uncommon, and apparently in Leipzig about 50% of the children seen in the clinics at one time had had hepatitis. Many cases were observed at Leipzig which were believed to have had hepatitis without jaundice. The presence of virus produced jaundice had been proven and the virus had been transmitted from egg to egg for 14 consecutive times.

Malnutrition. The internists did not admit that the treatment of malnutrition had ever been much of a problem. For protein deficiencies they relied on oral feedings; amino acid preparations were not available for intravenous use.

Miscellaneous. At Leipzig the B. coli agglutination test was used for the diagnosis of infections such as colitis or pyelitis. Organisms were obtained from duodenal washings or the urine, and if the patient's titre by agglutination test was at least 1-80 it was accepted as an indication of infection due to this organism. This cumbersome test was apparently routinely utilized. At Leipzig they had been doing a great deal of research on the reactions obtained from applying the various laboratory tests to people of all age groups; previous studies had been made on the very young and on the elderly, but there was no standard which covered the entire span of years. Apparently a German publication has been organized to foster such studies, and Prof. Stenger is one of the editors of this magazine.

Conclusions:

a. Medical education in Germany during the war has been curtailed by approximately 50%.

b. The caliber of the graduate in German medical schools during the war is definitely inferior to the peacetime level. It is estimated that from the observations made, as well as from information gained by interview with professors, that the graduates of German medical schools are about 50% as well qualified as during peacetime.

c. It is doubtful if any significant new developments have been made in either medical or surgical research.

d. The surgical equipment was of a pre-war standard.

e. There were no new advances noted in surgical treatment, although sound surgical principles of pre-war standard were generally adhered to.

f. Chemotherapy in the form of various sulfonamides were widely used, and in some instances in dosages considerably greater than those used in the US. Army. The attitude as to its effectiveness was consistent with that of the US. Army. Penicillin was not available.

g. There was a lack of appreciation of the actual requirements of blood and plasma in the treatment of shock, burns, etc.

h. Blood banks were not utilized, although fresh whole blood was used liberally.

i. There was nothing new in the treatment of such common pathological conditions such as gas gangrene, tetanus, and typhus.

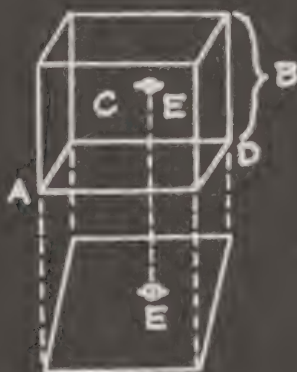
j. Standards of medical practice in Germany will undoubtedly show the deteriorating effects of war for years to come. There will be a marked deficiency in well-qualified specialists and teachers. The heads of the departments at Jena and Leipzig appeared to be of high caliber and will continue to be the nucleus for high standards of medical education when, and if, the proper opportunities arise.

B. Medical School, University of Erlangen.

A separate visit was made to the Medical School of the University of Erlangen. The following report prepared on the basis of this visit is presented here as adding further information on medical practice in German medical schools to the picture presented in the preceding section.

The Medical School of the University of Erlangen was active until the close of the semester ending February 1945. Since then no students have been admitted, though instructors and heads of departments are continuing their work in the University Hospital and laboratories. The buildings and hospital of the University are in good physical condition and are well equipped. The dean of the Medical School, Dr. Albert Hasselwander, is also head of the department of anatomy and anthropology.

Dr. Hasselwander has for years been working on what he calls the anatomy of the living body. This study has been carried out mainly by the use of stereorcentgenograms. His chief contribution to this technique lies in the use of semi-transparent mirrors in the standard type reontgenograph stereoscope. This permits the observer to "work within" the virtual image, so that a clay model of it may be made. These models have been employed by plastic surgeons in the reconstruction of shattered bones. More useful are the cross-sectional drawings that can be made by projecting a given plane of the virtual image upon a sheet of paper by means of a simple drawing device. With the use of these cross-sections, foreign bodies such as bullets or shell fragments may be localized within 1 mm. of their true position. The method is fully described in Steckschuss und Röntgenstrahlen, by A. Hasselwander, Leipzig, 1940. Surgeons of the University Hospital, when subsequently questioned, stated that they had found the method most useful. The apparatus is constructed by Hans Pausch, 117 Hauptstrasse, Erlangen.



Virtual image.

Projection through plane A-D Showing relative position of Object "E"

Machine Shop of Hans Pausch.

This small machine shop is located at 117 Hauptstrasse, in Erlangen. The proprietor, Hans Pausch, states that he normally employed about 10 men and limited his work to the construction of x-ray equipment, exclusive of tubes and electric apparatus. Besides the custom-built x-ray units such as his Rotaskop II he also constructs the completed stereoskiagraph designed by Dr. Hasselwander. The shop contains about a dozen rather small lathes;

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during the war these were used for producing machined parts that were shipped to larger plants for incorporation in war equipment. At present some work is being done, but is hampered by lack of supplies. The conversion back to the production of x-ray apparatus has been completed.

Dr. Eugene Kirch is head of the department of pathology. Since the pathological institute of the University of Würzburg was bombed out, he has received all surgical specimens for diagnosis in this entire area of Bavaria; these may number as many as 40 to 50 daily. A well appointed morgue provides adequate facilities for postmortem examinations. Dr. Kirch's chief investigative work has dealt with the pneumoconioses, and with cardiac hypertrophy following continued physical exertion.

Dr. Karl v. Angerer, director of the department of hygiene and bacteriology, committed suicide a few days prior to the time that the University was visited (May 1945); apparently he was despondent over the defeat of Germany. Dr. v. Angerer was also head of the Bakteriologische Untersuchungsanstalt, which is a state laboratory for routine bacteriological and serological examinations upon specimens sent in by the physicians and hospitals of this region. The Anstalt is in the same building with the department of bacteriology and hygiene of the University. His successor to the post is Dr. Eckstein who is not carrying out any bacteriological investigations, but in the past has made studies on nutrition with particular reference to the value of different kinds of bread. The bacteriological and serological techniques are similar to those employed in the United States. Besides the standard Wassermann test for syphilis, however, another complement fixation test is used in which the antigen consists of killed spirochaetes purported to be Treponema pallida. Dr. Eckstein states that there have been no epidemics of contagious diseases among the civilian population during the war.

Dr. Otto Goetze, chief surgeon, is best known for his sacral approach in removal of rectal carcinomata. By this means he preserves the rectal sphincter, making colostomy unnecessary. Dr. Joseph Jordan, an assistant, is a general surgeon, though his chief interest lies in the field of neurosurgery. He demonstrated two cases of brain abscess that had healed well and another which apparently was on the road to recovery. He attributes his success to the use of pieces of sponge rubber as drains. The pulsations of the surrounding brain tissue alternately compress and expand the sponge, forcing out the exudate that has accumulated within it. Dr. Jordan states that early in the war, before this technique was introduced, the mortality from brain abscesses following head injuries was very high.

The Küntscher nail, which passes through the length of the marrow cavity, is used for the fixation of uninfected fractures of long bones. This is a new method with which American surgeons were unfamiliar until a few months ago. Dr. Jordan stressed the

fact that fat emboli may form when the nail is used in the femur; this is prevented by aspirating the fatty marrow before introducing the nail. The nail, which is of stainless steel - V2A Krupp Stahl, is removed after union of the parts has been demonstrated by x-ray. The limb is kept in a plaster cast for only the first 3 to 4 weeks, after which the cast is removed and gradually increasing use of the arm or leg is encouraged.

Blood transfusions by way of the bone marrow have been extensively employed, particularly in the case of infants and children. From personal experience Dr. Jordan concluded that sites containing large amounts of fatty marrow should not be used as the danger of fat embolism is great. The sternum or small bones of the wrist and ankle are safe and permit an equally rapid flow of blood. He has demonstrated the rapidity with which the blood thus injected into the bone marrow reaches the large veins by a series of x-rays.

Dr. Konrad Schubel is head of the department of pharmacology and toxicology. Since the onset of the war the department has been carrying out little research, being busy with teaching duties and routine toxicologic examinations. Dr. Schubel claims to be unaware of any new anti-malarial drugs, nor is he familiar with recent investigations in the field of blood substitutes, sulfa drugs, or penicillin. He has been carrying out some studies on the carcinogenic effect of certain dyes, particularly colchicine. Thus far his results have been negative.

Dr. Friedrich May is head of the department of physiological chemistry. In the catalogue of the university he is also listed as giving a course in aviation physiology. He was closely questioned on this latter point but insisted probably with truth, that he had never done any research in this field and that the course merely consisted of a series of lectures based upon data available in the literature. For the past 15 years Dr. May has been devoting all his investigations to a study of carbohydrate metabolism. In 1931 he discovered an animal polysaccharide, which he named galactogen. This and glycogen are the only two polysaccharides known to exist in the animal body.

In summary, the Medical School of the University of Erlangen has an intact physical plant, and, though many of the younger instructors are in the German Army, the heads of departments are still at their posts. The University Hospital is fairly well staffed and has suffered no damage. In view of the, at least temporary, loss of many German medical schools, it may be pointed out that this school can be rapidly placed into almost full operation.

II Dental Education in Germany.

This review of dental education in Germany is based on interviews with:

1. Prof. Dr. Adolf Klughardt,
Director of the Dental School,
University of Jena.
2. Prof. Dr. Karl Hauenstein,
Director of the Dental School,
University of Leipzig.
3. Prof. Dr. Otto Heinroth, brother and assistant of
Dr. Hans Heinroth,
Director of the Dental School,
University of Halle.

There are in Germany two types of licensed dental practitioners: the general dental practitioners (Zahnarzt), and the "Dentist", who is a glorified dental technician, but who also carries out certain minor treatments such as the filling of teeth.

After the advent to power of the Nazi regime, a Reichszahnkammer (National Dental Chamber) which controlled every phase of dental practice and education including admission to dental schools. Selection of students was based on the following considerations:

The total number of dental students to be admitted each year was determined in Berlin after a survey of national requirements for replacement and new positions.

To date, no one has been found to give an accurate official statement as to the total number graduated per year. Dr. Adolf Klughardt of the University of Jena estimated a total of five hundred new students a year. This estimate appears low, but is corroborated somewhat by the average size of graduating classes in the universities seen thus far (twenty-five to thirty-five graduates).

In theory, each university was given its pro rata share of the entering students. Ability to modify this number gave the allocating authority a strong lever for control of the university.

To be qualified for admission to a dental school, a student must have finished the equivalent of a high school course, totaling at least twelve years and hold a "Maturitäts" certificate based on examination at the end of this course. This basic course of training usually included mathematics and sciences above the grade of school level, but they were not required. Latin was required and if not included in preliminary schooling a special examination was necessary. Provision was made for admission of students lacking the required basic schooling, but who showed particular aptitude and ability as determined by long and exhaustive investigation by the dental faculty. Seldom were more than one or two such students admitted to any one university in one year. Political pressure was sometimes exerted to have good party members admitted on this basis.

Qualified students were accepted, in theory at least, on a "first come, first served" basis. Most students paid their own fees, though the government aided a few "worthy" students of outstanding ability or political activity. (During the war fifty per cent or more of all students were soldiers whose expenses were paid by the government. The government also paid for the dental education of a small number of discharged veterans, estimated at ten per cent or less of students.)

The course of study was divided into a preclinical course (Vorklinische Kurs) and a clinical course (Klinische Kurs).

The preclinical course lasted three (3) semesters of about four and one-half months each. The following subjects were included:

| | |
|------------|--|
| 2 semester | Prosthetic Laboratory |
| 1 " | Dental Materials and Metallurgy |
| 1 " | Introduction to Orthodontia |
| 1 " | Filling operations on Mannequins |
| 2 " | Anatomy (with Dissection of head and neck in winter months. Dissection not considered practical in warm months.) |
| 2 " | Physiology |
| 1 " | Histology |
| 2 " | Chemistry |
| 2 " | Physics |
| 1 " | Histology Laboratory |
| 1 " | Chemistry Lab. |

This course was followed by a rigid examination (Physikum) to determine fitness to continue studies. Few students were dropped at this time, however.

The clinical course lasted four semesters and included the following subjects:

| | |
|------------|--|
| 2 semester | Crown and Bridge Construction |
| 2 " | Prosthetics |
| 2 " | Orthodontia (Practical cases) |
| 1 " | Ceramics |
| 1 " | Instrumentation |
| 1 " | Dental Public Health |
| 1 " | Treatment of Fractures |
| 2 " | Operative Dentistry |
| 3 " | Clinic for Mouth and Jaw Diseases (1 semester observation, 2 semesters practical) |

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| | |
|------------|---|
| 1 semester | Dental Hygiene |
| 1 " | Pharmacology |
| 2 " | Pathology (1 semester general, 1 semester dental) |
| 2 " | Internal medicine |
| 2 " | Skin and Venereal Disease Clinic (Lecture and clinic) |
| 2 " | Surgery (General and Dental) |
| 1 " | Ear, Nose and Throat (Lecture) |
| 1 " | Laryngology (Observation) |

On completion of the full course, the student appeared before the full dental faculty for an examination which included theory and practice, with a write-up of cases assigned for treatment in the clinic. If successful he was given the degree of "Zahnarzt" (not "Doctor") and could enroll in the National Dental Chamber and practice in state insurance clinics. This examination was under state control, though questions were formulated by the examining committee. It authorized practice anywhere within the Reich.

No dental internships were required, though for economic or professional reasons most graduates spent several years in hospital or institutional clinics or with private practitioners before establishing their own practices.

Men desiring to specialize took compulsory post graduate courses given in the larger centers. The course for Surgery lasted one year, for Orthodontia two years. They then were examined by a professor licensed by the state to conduct such enquiries, the examination lasting about two weeks. If successful, the candidate made application to the "Reichszahnärzte Führer", or government chief for dentistry, for registration as a specialist. After registration the specialist could not engage in general practice, but had to limit his activities to his chosen field. The ordinary Zahnarzt could practice in these special fields, but could not hold himself to be a specialist.

The course of study for dentistry was not cut from the previous three and one-half years before the war. Other factors, however, served to reduce the effective time available for study to a point where all dental educators interviewed felt that courses were dangerously inadequate. Among these adverse factors were:

a. Almost all students were in the military service and devoted the equivalent of one day a week to military duties.

b. Staffs of schools were so depleted that they were unable to devote sufficient time to students.

c. Physical facilities were destroyed or seriously damaged by air raids.

d. Students spent many hours in air raid shelters during both day and night, interfering with classes and study periods.

During the war a large but variable proportion of dental students were in active military service. The exact proportion is probably not known by anyone outside of Berlin and cannot be determined at this time. The remaining students were women, discharged veterans and physically disqualified males. At Halle about twenty-five per cent of students were women, about twenty-five per cent discharged or physically disqualified males and fifty per cent military personnel. At Leipzig two-thirds of the students were women. At the beginning of the war students who had had military training were mobilized immediately and sent to line units. Other students were taken from the schools according to their conscription status without regard for scholastic situation except that students within a few months of graduation were generally allowed to complete the course. Former dental students who made good records in line units were transferred after about six weeks to the SANITÄTS KORPS, given non-commissioned grades after a few months, and returned to school at government expense. Selected discharged veterans were also returned at government expense, though in small numbers. No students were continued in dental school at government expense without first serving as enlisted men. On graduation dentists, whether military or civilian were taken into the Army or, if not physically qualified were sent to replace dentists taken into the Army. No freedom of choice of place to practice was allowed during the war. Army dentists were given infrequent courses in oral surgery of about one week in specially designated universities. Such courses usually did not include clinical practice and comment on them was unfavorable by both dentists and faculty.

In general, the enrollment fell off greatly from 1934 to 1939. Cause of this decline is not clear and will be further investigated. At Leipzig, for instance, nearly 600 students were enrolled in 1934. By 1938 this number had fallen to 150.

The classification of "Dentisten", as distinguished from "Zahnärzte", originated as a result of attempts of dental laboratory men to engage in treatment of patients. Their position in German dentistry will be discussed elsewhere but the following is the schedule of their professional training:

Four years public school (twelve for Zahnarzt)

Three years as apprentice laboratory man, during which time he attends a school two mornings a week where he gets the rudiments of physics, chemistry and anatomy.

One year as journeyman laboratory technician.

One year formal schooling at one of six schools.

He must pass an examination before a board composed of one doctor of medicine, one Zahnarzt and one "Dentist". On graduation he may not give general anesthesia, practice major oral surgery or orthodontia. He may, however, work on equal terms in the state insurance scheme.

Most dental schools functioned with increasing difficulty up to the spring of 1945. Damage to buildings and equipment will run from sixty per cent (Halle) to ninety percent (Jena). No university visited thus far has escaped. Staffs have been scattered and some prominent dentists were involved in Nazi affairs to a point that makes it improbable that they will be available for some time. School authorities are anxious to resume teaching, however, and are already carrying on clinic treatment without students in improvised buildings. How soon they will function again cannot even be guessed at as the world has never before seen the almost complete destruction of all the principal cities of a large nation. One hears serious estimates that years will be required to even clear away present debris. In view of the anxiety of Germans to restore medical education, however, it is believed that partial operation with reduced classes will begin in improvised quarters almost as soon as authority is granted by the occupying forces. On the other hand it is difficult to see how the former facilities can be restored in less than ten years. Dental education in Germany was hampered by political interference with universities long before the war, and the damage done during the war has only served to accentuate the decline of German dentistry which probably began with World War I and its aftermath. At this time there is great respect for American dentistry in Germany, and the desire is often expressed that an interchange of dental educators might take place when such a move becomes practical.

III. The Prevention of Dental Caries in Germany.

This report is based on interviews with directors of three dental schools at Jena, Halle and Leipzig, with public health officers at Jena and Wuppertal, with the chief dentist of the state insurance system at Wiesbaden, and with considerable number of military and civilian dentists.

As would be the case in the United States there was no general agreement among the men interviewed regarding the cause or prevention of dental caries. Opinions expressed generally followed lines of thought well known in the U.S. but there was complete ignorance (with one minor exception) of the possible role of fluorides and either ignorance or skepticism regarding the possible relation between high acidophilus counts and susceptibility to caries. Due to the conflicting opinions expressed on many subjects no attempts will be made to correlate them, but representative opinions will be reported as expressed. A summary will be presented of these opinions and procedures generally agreed upon.

Dr. Franz Kinkel, chief dentist of the state insurance system at Wiesbaden (and prominent Nazi) believes that caries have increased in children during war, particularly in the age group which was approaching adolescence at the beginning of the war (also believes that periodontal disease has increased in older groups). He believes that prevention of caries must be based on hygiene, early fillings, and use of vitamins. Surprisingly and apparently without rationale, he feels vitamin B complex to be most important. He had never heard of fluorine therapy, acidophilus counts or vaccines. Children in schools received semi-annual dental examinations, and correction of defects was compulsory, either in a free school clinic or by a dentist of the parent's choice. Kinkel had no knowledge of recent research on dental caries.

Dr. Adolf Klughardt, Director, Dental School, University of Jena believed that the most important consideration is general diet, second is proper vitamins, third, adequate child care (referring to home conditions, fresh air, exercise, etc.) Free dental care for schools has been provided in Jena for three years. School children examined semi-annually, treatment was compulsory. Expectant mothers received a half litre milk daily, babies up to two years received 3/4 litre. Expectant mothers received vitamin D, dosage unknown (expressed as several drops of concentrate" daily.) Children in school received 100 milligrams ascorbic acid daily from October to April, also vitamin D. Expectant mothers and growing children also were given an increased butter ration. Children were taught oral hygiene in school, and were taught to eat vegetables and fresh fruit. They received 1/2 litre of milk daily in school. He thinks that until the lacto-bacillus have been proved to be the cause of caries, lacto-bacillus counts would be of little value. He does not believe war diet has resulted in damage to teeth.

Dr. Otto Heinroth, brother and assistant of Dr. Hans Heinroth, director of dental school of the University of Halle believes diet to be of the utmost importance. He gives his own patients calcium phosphate, six gms daily in pre-school and early school years. School children get 100 milligrams ascorbic acid daily during the winter. Vitamin D. concentrates were often given to school children in homes, but were not provided in schools. He believes the most important factors are too little calcium in the teeth (cause not known), inherited disposition, poor hygiene and use of white bread and sugar. He would not state whether diet or hereditary factor is the most important. He believes that an adequate diet helps, but will not prevent caries if hereditary predisposition is present. No knowledge of fluorine therapy or recent research on caries.

Dr. Johann Hauenstein, director of dental school, University of Leipzig believes that the war time diet has resulted in more caries. Believed that caries is a result of "wrong ways of living", defined as poorly chosen over-refined food lack of vitamin found in

fresh foods and general mode of civilized life." He quoted findings of Dr. Euler of Leipzig who examined skeletons of soldiers killed in old wars, tending to show that teeth of children raised in periods of national depression following wars (presumably raised on simpler diets) were better than the teeth of children raised during periods when the nation was in the ascendancy. He believes heredity to be important, but secondary to diet and mode of life. He has no knowledge of lacto-bacillus counts but claims to have heard of fluorine therapy almost fifteen years ago. (Very vague and believed confused on this point, though it was made certain that he actually was referring to fluorine therapy, and not to the role of fluorine in mottled enamel.) At any rate he was not favorably impressed with the ideas that proper fluorine intake might reduce caries. No knowledge of recent research on dental caries.

Director, Public Health Office, Wuppertal believes dental health of children suffered during war due to diet and general dislocation of home life. Vitamin C was given to school children during winter. Vitamin D was given to many infants, but was not provided by state. No knowledge of fluorine therapy acidophilus counts, or research on dental caries.

Others interviewed generally followed the lines of thought quoted above. Some conclusions generally agreed upon are:

a. Dental health of children reaching adolescence during the war has been adversely affected by dietary deficiencies. This point was not unanimously concurred in, and there is no visual evidence that German children did actually suffer such deficiencies. In France one is likely to underestimate the ages of children by three years or more, but German children appear sturdy, well filled-out and normally developed for their ages. Due to disorganization caused by the war there is no statistical information available which proves or disproves this point and it must be accepted with reservation.

b. German dental educators believe that both diet and heredity may play a part in dental caries formation. They incline to place most emphasis on diet, probably because that is the only controllable factor.

c. Vitamin C and D are considered important to oral health.

d. It is not believed that dietary or other known measures will totally eliminate dental caries.

e. Fluorine therapy and use of lactobacillus counts are unknown, as is the possible use of an acidophilus vaccine.

f. When the subject of "Preventive Dentistry" was mentioned in Germany it was always first interpreted as meaning "early treatment". Actual prevention of caries is regarded without much optimism and in spite of constant inquiry no research along this line has yet been uncovered. In the event that such research is discovered it will be the subject of a supplementary report.

IV. Veterinary Education, Food Control and other subjects of Medical Interest.

1. Veterinary Institute, University of Jena.

Dr. Victor Goerttler is the director of the Institute. He stated that this institution is unique in that all veterinary matters in Thuringia were administered from it. It does not confer degrees in veterinary medicine, but merely trains students of agriculture. The course embraces anatomy, physiology, breeds and breeding, communicable diseases, and veterinary research. The course constitutes one-fourth of the agriculture course. Students are not selected. Entrance requirements for students from a "classical" high-school (Gymnasium) include Latin, Greek and one modern language other than German, mathematics physics and chemistry; graduates from a "non-classical" high-school must have had mathematics, physics, chemistry, and one modern language. Students must have two years of practical work on a farm, and the course at the Institute taken three years (6 semesters). To receive the degree of Doctor of Agriculture, students must continue for one or two additional semesters, and prepare a thesis on some research problem. While classes have averaged 30 students, there has been no teaching since 1939. Students who were in the Army were not accepted. The institute is capable of handling 50 to 60 students.

Research problems were investigated by the staff of the Institute and by students working for an advanced degree. Most of this research was concerned with fecundity, which, in the opinion of Dr. Goerttler, is influenced by many diseases. Dr. Goerttler has 14 veterinarians throughout Thuringia who are trained in the control of infectious diseases. These men tag all sick animals and forbid their use as brood stock. This practice, plus the practice of allowing the males to run with the herd has increased the birthrate. In 1936 - 1937 the rate was 5.8% higher than in 1934-35.

Infectious abortion (Bang's disease). The informant stated that at least 20% of the cattle are infected. Use has been made of the vaccine developed by Duck of the U.S. Dept. of Agriculture, but Dr. Goerttler states that it proved unsatisfactory because infection occurred after breeding. (N.B. The writer (Col. Reynolds) does not believe this to be true.) It was also stated that it is difficult to control or eradicate this and other diseases, as there

are many small owners who have to be educated. Calves from large herds are segregated, but not those from small ones. As infected cows cannot be destroyed, resort is had to pasteurization of milk.

In Thuringia, only milk from abortus negative cows is employed for children and sick persons. (N.B. This is also questionable. Col. Reynolds.)

Milk is collected in a "milk shed," then pasteurized, and dispensed along the streets from cans. Milk for the use of sick persons is bottled. Ordinary pasteurized milk costs 20 pfennigs, while milk for babies and invalids cost 80 pfennigs. Milk production in Thuringia has been 2,500 liters per year per cow. The population of Thuringia is about 4,000,000.

There were 60 cases of brucellosis in one year. In arriving at a diagnosis in cattle, the agglutination test, employing blood serum and milk serum, is used.

Tuberculosis. Records were kept up to 1937, but thereafter the disease was disregarded and the records since that time are not accurate. Before 1938, in Thuringia, in 2500 communities with 100,000 farms there were 2 to 3 cows on every farm. Testing would probably have found 2 out of 3 cows infected, so that pasteurization was employed.

In 1938, a voluntary testing plan was put forth, but not all farmers cooperated. Of 350,000 cattle tested, 68,000 were physically and bacteriologically infected. Dr. Goerttler felt that the figures were too low as they were based on physical examination, culturing of sputum and milk, and guinea pig inoculations. Tuberculosis was not used as too many reactors would have been detected, but in Goerttler's opinion the examination was better than nothing. It was the method of Ostertag and is not adequate to eradicate the disease. Larger farms are willing to T.B. test their cattle, but smaller ones are not.

Positive cattle were killed and the owners were paid the selling price of the carcass plus an additional sum provided by the state. The inspection of meat from such cattle was poor and much unwholesome meat was passed, considerations of health being disregarded.

In 1936 throughout 17 Kreise, involving 412,000 cattle, 12% under 1 year were found infected, while among cattle over one year 38% were infected. Under the present system it is impossible to eradicate the disease.

Foot and Mouth Disease. The disease appears sporadically in Kreis Weimar and Kreis Camburg. On February 15, 1945 there were 1,769 infected farms throughout Germany.

Infected farms and persons living on them are quarantined. All the normal cattle of the village or larger area are vaccinated

if the situation requires this measure. Infected cattle are kept in barns until they recover or die. Barns are disinfected daily (?) until cattle are well. Milk is pasteurized on the farm and can not be removed. Fertilizer is disinfected with quicklime. Quarantine continues for 14 days after the last case has recovered, at which time the premises are disinfected. For curative purposes the administration of serum in doses of 150 to 200 cc. usually proves adequate and requires about 8 days. Moderately severe and severe cases require about 10 days, otherwise such cases die. Serum is of no value in cases of long standing.

Vaccine and anti-serum was prepared by Waldmann on the Island of Riems, off Greifswald, in the Baltic. In its preparation susceptible cattle receive a lingual infection. In about 10 days blebs appear. These are then curetted off, passed through Berkefeld filters, and tested for infectivity. The product is subsequently precipitated in the cold with alum, centrifuged, and tested for sterility. When Dr. Goertler was asked whether chloroform was used before the alum precipitation, he replied that he thought this to be the case. Professor Wagener, of the Veterinary College at Hannover, was Dr. Waldmann's assistant.

The dose of vaccine per 300 kg. of weight is 60 cc. It is injected subcutaneously into the dewlap. The animal is observed for 8 to 10 days, temperatures being recorded at regular intervals. Only a few cases have occurred in vaccinated animals. Simultaneous serum and virus vaccination has proven to be valueless.

The laboratory is capable of producing from 5,000 to 10,000 liters of vaccine, and from 50,000 to 100,000 liters of serum per month. Dr. Goertler states that the present laboratory is inadequate for sufficient production.

Anthrax is not an important veterinary problem here. Only one case occurred in 1945. The animal was buried in quicklime, and the premises were disinfected and quarantined for four weeks.

Glanders is rare. One case in a horse from Russia occurred late in 1944. Swine pest does not occur in Thuringia, but there are cases in East Prussia. There were 19 cases in the Ostmark (Austria). The animals were killed and the premises disinfected.

Rabies occurs only in the east. There were 24 cases in all Germany on 1 January 1945. In an epidemic all stray dogs are destroyed and others quarantined for as long as four months. Vaccine is not used.

Chicken cholera is unimportant. Fowl pest is usually imported from Hungary. There were some cases in Thuringia in January 1945. All the flocks were killed and the premises disinfected.

There have been no cases of trypanosomiasis for 20 years.

Diamond skin disease of swine occurs during the hot months, For this reason vaccination usually is performed in April and May. Ten cc. of serum and one cc. of virus vaccine are administered simultaneously.

There are some cases of scabies among sheep and horses, and these are treated with sulphur gas.

Cattle and sheep pox are not important.

Equine encephalomyelitis has occurred to the extent of 100 cases in two years. It was stated that losses were formerly about 95%, but since the introduction of the sulfonamides the mortality rate has been reduced to about 45%. Vaccination is not practised. In view of the occurrence of cases of encephalitis among humans in Jena and, perhaps, elsewhere, this disease may be important and would warrant attention.

The school building is in good repair. It is clean and orderly, and has adequate classroom space and laboratory facilities for research. The Director appears to be an intelligent, capable person, who, if he is telling the truth, realizes that indifferent methods are furthering the incidence of disease, and is anxious to do something about it.

2. Veterinary Institute, Halle. Prof. Ulrich Gerhardt, Director.

This institute is part of the Agricultural College and does not grant a degree in veterinary medicine. It has carried on some research, and has maintained a clinic for large and small animals. The general appearance of this small establishment is unimpressive.

The entrance requirements are like those of similar German institutes. In 1942, there were 150 students, but by 1939 the attendance had fallen to 20, and from 1940 to 1945 the number of students in classes ranged from 7 to 15. While the school previously had no soldier students, from 1940 to 1945 the students were all ex-soldiers invalided out of the service.

Dr. Gerhardt is an elderly man, a typical scholarly, professorial type. He has done quite a good deal of research on animal physiology, hormones, the urinary system, general zoology, and the biology of spiders and slugs. While Dr. Gerhardt is to be commended on his zeal and enthusiasm for research, despite the fact that it runs to copulation and masturbation by our garden friends, it is felt that the facilities of the institution with its faculty depleted to two persons would not prove inspirational.

3. Veterinary Institute, Leipzig, Professor Ackerknecht.

This institute is a department of the University of Leipzig. It was apparently a good institution, but as a result of bombing, little is left of it. All that is left of the faculty are Professor Ackerknecht and two assistants.

Entrance requirements are a certificate of graduation (Reifezeugnis) from high-school (Gymnasium), as well as evidence of proficiency in Latin, French, and some English. Before the war, classes comprised about 50 students. In 1942 there were 30, in 1943, 20 and in 1945, 30 students. After successful completion of nine semesters (4½ years), students received a diploma permitting them to practice. The degree of Doctor of Veterinary Medicine was granted if the student carried out a research project upon which he wrote a thesis. This required an additional period of work ranging from six months to one year.

All the collection and demonstration models of the institute have been destroyed, but Professor Ackerknecht feels that teaching might be resumed in two or three years depending on the rate of reconstruction. There will be no classes until that time. Although there will be no classes, Professor Ackerknecht intends to continue his research work. He is the author of a veterinary anatomy, and many papers dealing with research in biology.

4. Serum Institute, Dessau, Professor Fischer and Dr. Hoffmann.

This establishment was subjected to severe bombing and is now housed in a small brick building close to its original location. Both Professor Fischer and Dr. Hoffmann were interrogated but no information was obtained.

5. Anstalt für Pharmazie und Lebensmittelchemie der Universität Jena. (Institute for Pharmacy and Food Chemistry, University of Jena).

This institute is concerned with the chemistry of food and drugs. The building and grounds show lack of care, and the structure has suffered damage as a result of bombing. When visited the laboratories and corridors were littered and the equipment was covered with dust from falling plaster. It has not been in operation since April. Professor Oscar Keller is in charge, but in his absence, his associate, Dr. Heinz Panzer, acted in his stead.

The work on food products is akin to that of Army laboratories, with the exception that it performs only chemical analyses, not bacteriological ones. The equipment employed in accomplishing the task is the same, and involves the determination of carbohydrates, fats, protein and water in order to ascertain whether meat products from packing plants, stores, etc. submitted by government inspectors, fulfill the requirements laid down in existing regulations. Furthermore, prepared vegetables and fruit products are analyzed for the same reasons, as unfulfilled extravagant claims set forth in labels are punishable by law.

In addition to the activities described above the Institute also gives a course in materia medica, and conducts research in this field. The classes average between 50 and 55 students per semester, and include students from other departments of the University, with the exception of the medical department. About 5% of the students specialize in this subject, and after completing the ordinary six-semester (3 years) course take advanced training for an additional two or four semesters, after which they receive the degree of Doctor of Natural Science. Students who successfully complete the three-year course are graduated as druggists. Owing to the need for work in food chemistry there have been no students during the war.

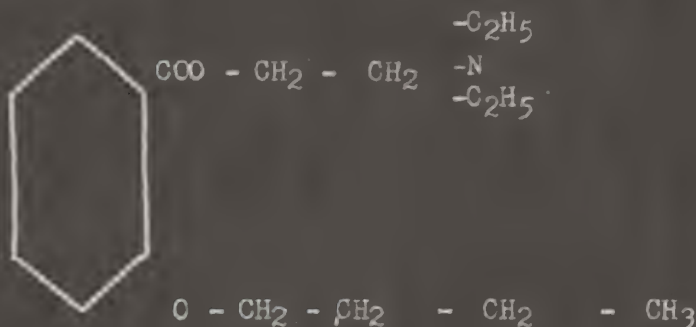
The work of this institute involves principally the extraction of drugs. In addition, a certain amount of research was conducted. Since the beginning of the war, however, little has been accomplished.

Dr. Panzer is endeavoring to perfect a method of extraction by which a greater yield of quinine may be produced from cinchona bark. This work is not complete. He had no samples of quinine at the time of the visit. He is endeavoring to do the same for belladonna. The workers at this institute have found no substitute for morphine.

On routine questioning regarding research in local anesthetics the Assistant Director of this Institute stated that he knew of no recent work in that field. It was known, however, that Dr. Rohmann had at one time been associated with the University of Jena but he had been reported in Posen, Russian occupied territory. When questioned about him the Assistant Director admitted readily that Dr. Rohmann had returned to Jena and was available at the time.

Dr. Rohmann has continued during the war his experimentation in the field of local anesthetics though handicapped severely by lack of chemicals and facilities. Apparently he has worked principally with different acid salts of the same base which he patented in Germany in 1938. It is quite possible that this base which seems to be a close relative of pantocain, is known in the United States but Dr. Rohmann's work appears to be the most advanced in Germany and all available information regarding it is reported here for evaluation by experts in that specialized field.

The base material is called "Butoxybenzoesaure-Diäthyl-aminoethylester". Its graphic form is:

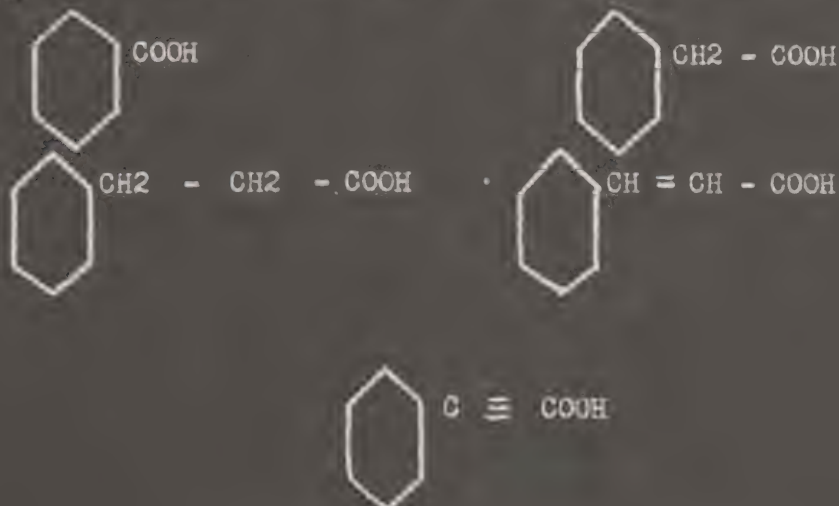


The HCl salt of this base has been used clinically at Halle for ophthalmic and dental purposes and at Frankfurt for throat, ear and nose purposes, but reports were never received by Dr. Rohmann due to the confusion of war. The material is used in not over two per cent solution when injected. Any common vasoconstrictor may be added in the same proportion as with novocain. Along this line it should be noted that German practice is to use four per cent novocain for dental purposes.

Claims for superiority of this material are:

- a. Greater effectiveness than novocain in same strength.
- b. Less toxicity than novocain.
- c. Will absorb from mucous membrane for surface anesthesia.
(Five per cent solution).

Dr. Rohmann was experimenting with combinations of his base with the following organic acids which may suggest leads for further study:



Dr. Rohmann expects stronger and faster action from combination with these organic acids but these claims are based principally on theoretical reasoning and not on clinical experiments.

Dr. Rohmann has none of his records, all of which were left in Posen with most of his equipment. No samples of the drug were left in Posen. Only two (2) grams were available at Jena, one of which was obtained and is being forwarded under separate cover.

6. Health Office, Jena. Dr. Karl Spann.

Tuberculosis has increased during the war, principally among foreign labor. According to Dr. Spann there was no increase among the German civilian population during the first four years, but during the past year the incidence has risen. Patients are cared for in a Tuberculosis Clinic under the supervision of a Tuberculosis Officer. Pneumothorax is practised. The clinic in Jena takes care of all Thuringia. Tuberculosis in children is said to be on the increase. This rise is ascribed to poor nutrition, but not to the great prevalence of tuberculosis in dairy cattle. Children are tested with tuberculin and it was stated that the reactions are increasing in intensity. Children are first examined in the clinic, and if the findings are positive they are admitted to a special hospital. Dr. Spann considers malnutrition the greatest factor contributing to poor health. He stated that the city's normal population of 70,000 has been increased by some 15,000 to 20,000 persons. In addition, evacuated persons are being added, and some 12,000 foreigners remain in the city. The population receives 1150 calories per day, which Dr. Spann stated to be insufficient. He also asserted that wheat is required for bread and fats. According to Dr. Spann trichinosis was not a problem.

The reporting of communicable diseases within 24 hours is mandatory. Coordination between the doctors and the health office is poor owing to lack of telephone communication.

It is said that no smallpox exists because vaccination at the ages of two and twelve is compulsory. The informant did not know anything about the past year as the schools have not been in operation and rosters are not available. No vaccinations have been performed.

According to Dr. Spann syphilis has decreased, but gonorrhea is on the increase. However, the records of the health office do not justify such a statement.

APPENDIX I

Medical Students at Leipzig, 1940 - 1945.

| | |
|---------------------------|-----|
| 1940 (1st. Trimester) | 252 |
| 1940 (2nd ") | 210 |
| 1940 (3rd ") | 354 |
| 1941 (Trimester) | 254 |
| 1941 (Summer Semester) | 139 |
| 1941-42 (Winter Semester) | 251 |
| 1942 (Summer Semester) | 264 |
| 1942-43 (Winter Semester) | 164 |
| 1943 (Summer Semester) | 233 |
| 1943-44 (Winter Semester) | 270 |
| 1944 (Summer Semester) | 288 |
| 1944-45 (Winter Semester) | 40 |

APPENDIX 2

Medical and Dental Students at Jena, 1939-1945.

| | <u>Medicine</u> | <u>Dentistry</u> |
|---------------------------|-----------------|------------------|
| 1939 (Summer Semester) | 439 | 25 |
| 1939 (Fall Semester) | 2134 | 57 |
| 1940 (1. Trimester) | 935 | 26 |
| 1940 (2. Trimester) | 462 | 25 |
| 1940 (3. Trimester) | 555 | 17 |
| 1941 Trimester | 508 | 17 |
| 1941 (Summer Semester) | 418 | 18 |
| 1941-42 (Winter Semester) | 434 | 22 |
| 1942 (Summer Semester) | 561 | 23 |
| 1942-43 (Winter Semester) | 692 | 23 |
| 1943 (Summer Semester) | 803 | 26 |
| 1943-44 (Winter Semester) | 949 | 26 |
| 1944 (Summer Semester) | 1209 | 58 |
| 1944-45 (Winter Semester) | 552 | 24 |

Number of Graduates

| | | |
|------|-----|----|
| 1939 | 100 | 12 |
| 1940 | 88 | 16 |
| 1941 | 87 | 7 |
| 1942 | 86 | 4 |
| 1943 | 74 | 6 |
| 1944 | 143 | 2 |
| 1945 | 160 | - |

APPENDIX 3

Papers Published by Members of the Medical Faculty,
University of Halle 1937-1944.

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